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ABSTRACT

Multiple effects of an increased rate of teacher questions on the verbal behavior of three institutionalized severely retarded children were investigated. Teachers were observed in training situations with the Ss and were then instructed to increase the number of questions requiring answers other than "yes" or "no." Results showed that the teachers noted several positive effects, that as their question asking ability improved, the students gave more varied responses and began to initiate more speech in general and answer questions with less prompting. The behavior covariations are discussed in terms of their desirability, causality, generality, predictability, strength, durability, and magnitude. (Author/PHR)

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Increasing Questions To Retarded Children:

An Analysis Of Multiple Effects

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Abstract

Multiple effects of an increased rate of teacher questions on the verbal behavior of three severely retarded children was investigated within a multiple baseline design. Teacher questions and subject answers increased significantly during the intervention. Several unintended effects, in the form of behavior covariations, were observed in each subject's behavioral repertoire. Teacher comments on the effects of intervention were overwhelmingly positive. The behavior covariations are discussed in terms of their desirability, causality, generality, predictability, strength, durability, and magnitude.

My perspective on "side effects" will become evident during the course of this presentation. Bob Wahler's experimental work (e.g., 1975) and an intriguing paper written by Jackie Holman entitled "The moral risk and high cost of an ecological concern in applied behavior analysis" (1977) initiated my interest in this area. The work of Wahler and Patterson (1974) has been the focus of my interest. Both of these researchers have studied the issue of side effects as it relates to social behavior. One obvious problem they have encountered is the fact that it is quite hard to code social behavior, particularly non-vocal social behavior, into discrete categories. It becomes a very difficult observational problem. In the study I'm going to talk about, we have attempted to circumvent this problem somewhat by examining vocal-verbal behavior. We did this for two important reasons. First, vocal behavior is very discrete relative to other behaviors, and thus readily available for a response analysis. Second, the contingent relationships in verbal interactions are generally easier to discern than among other types of behaviors. For these two reasons, we hoped to do a study of the multiple effects of an intervention which might show relatively clean effects. It has seemed quite conceivable to me that behavior covariations might be most successfully examined along the dimension of verbal behavior, with the current study as something of a prototype for such a line of research.

The intent of the current study then, was to measure the multiple effects of a treatment intervention on the verbal repertoire of three institutionalized retarded children. Normally, a behavior analyst might institute several modifications generally identified as components of an incidental teaching procedure (Hart & Risley, 1975; Rogers-Warren & Warren, in press) when the therapeutic goal is to increase a child's verbal repertoire. However,

for purposes of experimental rigor, only a single potentially powerful teacher behavior, question-asking, was increased in a multiple baseline across the three subjects. The verbal behavior of the subjects was coded into 17 response categories and teacher verbal consequences were coded into 13 response categories, to allow an analysis of multiple response effects of the intervention.

The purpose of this analysis was two fold: (1) to further contribute to the research on behavior covariations and side effects in general, and (2) to provide an analysis of the multiple (positive and negative) effects which might be expected to result from this specific type of therapeutic intervention. Such information will help verify its usefulness and validity in similar clinical situations.

Methods

The three subjects in the study were severely retarded and resided at a state institution and attended classrooms for language delayed students in that facility. They were observed in their respective classrooms. During these times each subject was seated at a table with the teacher and usually three or four other students. Subjects 1 and 2 were in one classroom with Teacher A; Subject 3 was in a second classroom with Teacher B. During observation times Subjects 1 and 2 were involved in such activities as counting, identifying colors, and identifying common signs; Subject 3 was involved in puzzle assembly, picture matching, etc. The instructional programs required the teachers to present trials to the students and/or give feedback for performance. The verbal interaction between teacher and student during these times was otherwise unstructured.

The observation system we used was designed to measure child verbal behaviors and adult verbal consequences for these behaviors. Child verbalizations were coded as one of 17 possible behaviors which could be grouped into seven categories of verbal behavior: imitations, answers, mands, instructions, statements, inaccurate statements, and greetings.

Because any given child verbalization could be defined by more than one definition, the coding of definitions was done on the basis of context, that is it's antecedents, consequences, and the topography surrounding it.

Mands, instructions, statements, inaccurate statements, and greetings were broken down into subject initiated and non-initiated sub-categories. This distinction was made because of the perceived likelihood that subject responses to teacher verbal consequences might change in ways independent of the subject's initiated speech.

A teacher consequence was defined as the occurrence of any coded verbal behavior that occurred within 5 sec after any subject verbal behavior. Many of the behaviors that met this requirement were also antecedents for subsequent subject responses. Thus, events were categorized according to their apparent relationship to subject verbal behavior. For example, consequences such as specific positives, general positives, specific negatives, and general negatives were all considered direct forms of feedback because they appear to function primarily as consequences for behavior rather than antecedents (prompts) for the next subject response. Other consequences such as questions and prompts, appear to function primarily as antecedents (prompts) for additional subject verbal behavior rather than as consequences, while some can serve a variety of functions. All subject response definitions and teacher consequence definitions were mutually exclusive.

Several 15-min observations were taken for each child each week. The observer made a verbatim recording of everything said by and to the subject. After each session he then constructed a transcript of all the subject's verbalizations and any verbal consequences for them using both the verbatim data and a tape recording. When the transcript was complete, the observer then scored each verbal subject response and teacher consequence according to the behavior codes.

In the intervention condition, each subject's classroom teacher was asked to increase their rates of asking questions of the subject. Questions were defined for purposes of the intervention as "an inquiry made to the subject requiring a verbal response other than 'yes' or 'no'". Thus, questions meeting this definition required substantive verbal responses from the subjects, and were not theoretical in nature. The teachers were instructed to increase their rates of question asking in conjunction with the primary task at hand and in a manner relevant to this task. The entire intervention procedure consisted only of requesting the teachers to increase their rates of other than yes/no questions.

Results

Figure 1 shows the number of questions directed by the teachers to each subject as well as the number of answers for each subject per block of responses.

Insert Figure 1 about here

In order to address the question of "multiple effects" of this intervention in the form of behavior covariations, a Pearson Product-Moment correlational analysis was conducted for teacher consequences and subject responses. For teacher consequences, the score of each type of consequence

was correlated with the score for teacher questions by blocks of responses. For subject responses, the score for each type of response per block of data was correlated with subject answers per block of data. Table 1 shows those teacher consequences covarying both positively and negatively with teacher questions and those subject responses covarying negatively (none covaried positively) with answers. The correlations shown were significant

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Insert Table 1 about here

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at the .01 level of confidence. All occurred during the intervention condition.

Only one positive correlation was found, between teacher questions and general positives directed to Subject 2. The only teacher consequence that covaried negatively with teacher questions for more than one subject was mands from Teacher A to Subjects 1 and 2. Among those subject responses covarying with subject answers were question/mands for Subjects 1 and 2, the statements for all three subjects. No answers also correlated negatively for Subject 3.

To complete the analysis of multiple effects of the intervention, the two teachers participating in the study were surveyed as to the positive and negative effects they observed as a result of the intervention.

Several positive effects were noted by the teachers. Both indicated that as the intervention continued they felt the quality of their question asking improved and that their students gave more varied answers. Both indicated that their subjects began to initiate more speech in general as the intervention continued and to answer questions with less prompting. Teacher B also noted that other students began to ask their peers questions and to shape answers, a possible effect of teacher modeling, and that her own rate of questions to other students increased.

No major negative effects were reported by the teachers for either themselves or their students. However, they reported that the procedure was sometimes more difficult to use than other times, depending on the academic program being run concurrently and that the academic programs often took slightly longer to run as a result of using the procedure.

Discussion

The intended intervention effects in this study were stable and strong for both question-asking and subjects' answers. The correlations reported reveal multiple effects which appeared to result from the intervention. Obviously, other types of multiple effects may have occurred as a result of the intervention. These could have shown up either qualitatively in other settings, at other times, or they could have been non-vocal in nature. However, such changes were either not strong enough to be noticed by the teachers, or were too low rate to be reliably observed during the observation sessions. The correlated changes that did occur will be discussed in terms of desirability, causality, generality, predictability, strength, durability, and magnitude.

Desirability. Five teacher consequences covaried with teacher questions. General positives increased and general negatives decreased for Teacher A to Subject 2. Both of these changes are obviously desirable effects. Negative correlations for yes/no questions, mands and instructions for Teacher A to Subject 1, and mands for Teacher A with Subject 2 appeared to be neither particularly desirable or undesirable effects. Two responses covaried with answers for the three subjects. Statements covaried negatively for all three, and questions/mands covaried for Subjects 1 and 2. These changes might be considered potentially undesirable. Mands are verbal

responses which function to control the speakers' environment and in this sense can be considered a valuable asset. While statements do not necessarily produce functional consequences, they were by definition correct and appropriate verbal responses. Since any correct and appropriate verbal behavior is desirable with severely retarded institutionalized children, the negative correlations noted here might be considered potentially undesirable. However, neither mands nor statements dropped out of the subjects' repertoires by any means. The correlated decrease in the no answers category for Subject 3 might be considered a positive effect since this suggests a greater degree of responsiveness was attained for this subject as a result of the intervention.

Causality. It is possible only to speculate about what specifically caused these behavior correlations because the analysis does not indicate whether the behaviors were related on a moment-by-moment basis within a session. Thus, one might speculate that teacher yes/no questions, mands and instructions directed to Subject 1 covaried negatively with Teacher A's questions because the function of these responses was supplanted by the increased questions. The positive correlations in teacher general-positives to Subject 2 and the negative correlation in general negatives may have resulted from an increased sensitivity on the part of Teacher A to the performance of Subject 2, or to the topography of her own behavior as a teacher. The negative correlations in subject questions/mands and statements may have resulted from increased teacher control of the verbal interchange resulting from their high rate of question asking. That is, the subjects simply had insufficient time or perhaps reason to engage in these behaviors proportionally as much.

Generality. There is a striking lack of generality across subjects for those teacher consequences covarying with questions.

Predictability. The lack of generality in covariations across teacher and subject repertoires reflects the difficulty a therapists might have had in predicting the response classes actually found on an apriori basis. Some logical predictions were possible and might have been borne out by the data. However, the lack of generality in the results would obviously have voided many of these. Furthermore, many responses might have been predicted to covary that didn't.

Strength and durability. The fact that the covariations were found at the .01 level of confidence indicates they may have been strongly related to teacher questions or subject answers. However, the durability of these covariations is uncertain. None of them were found to covary with questions or answers during the baseline. Thus, they could have been an artifact of the intervention, such that the relationships might have washed out had another experimental condition been implemented.

Magnitude. The issue of magnitude is important to a balanced perspective on the covariations found. Despite their strong statistical significance, these covariations were simply not very noticeable to the naked eye. While the teachers were readily aware of the increases in their own question-asking behavior and their students' answers, they did not report any of the effects noted as statistical covariations here. In their opinions, the intervention was a complete success with very few notable drawbacks.

Willems (1977) has argued on the basis of the ecological literature reported from the natural sciences that "every intervention has its price, no matter how well intentioned." This study supports a second argument,

however. It is undeniably true that unintended and unexpected effects may occur when an individual's behavior is modified, but the results of this study and others suggest that the desirability, causality, strength, durability, generality, and predictability of these effects are of a capricious nature.

By purposefully modifying a single verbal behavior, a systematic analysis of resulting multiple effects was attempted. In actuality, there were many types of possible effects which were not systematically measured for. Such a comprehensive analysis was not possible because of the enormous amount of time and labor it would have necessitated. Ultimately, it was necessary to rely on reports of teachers to complete the analysis. Paradoxically, the magnitude of the multiple effects that were found suggest that this simple survey method probably would have been sufficient to identify any serious effects.

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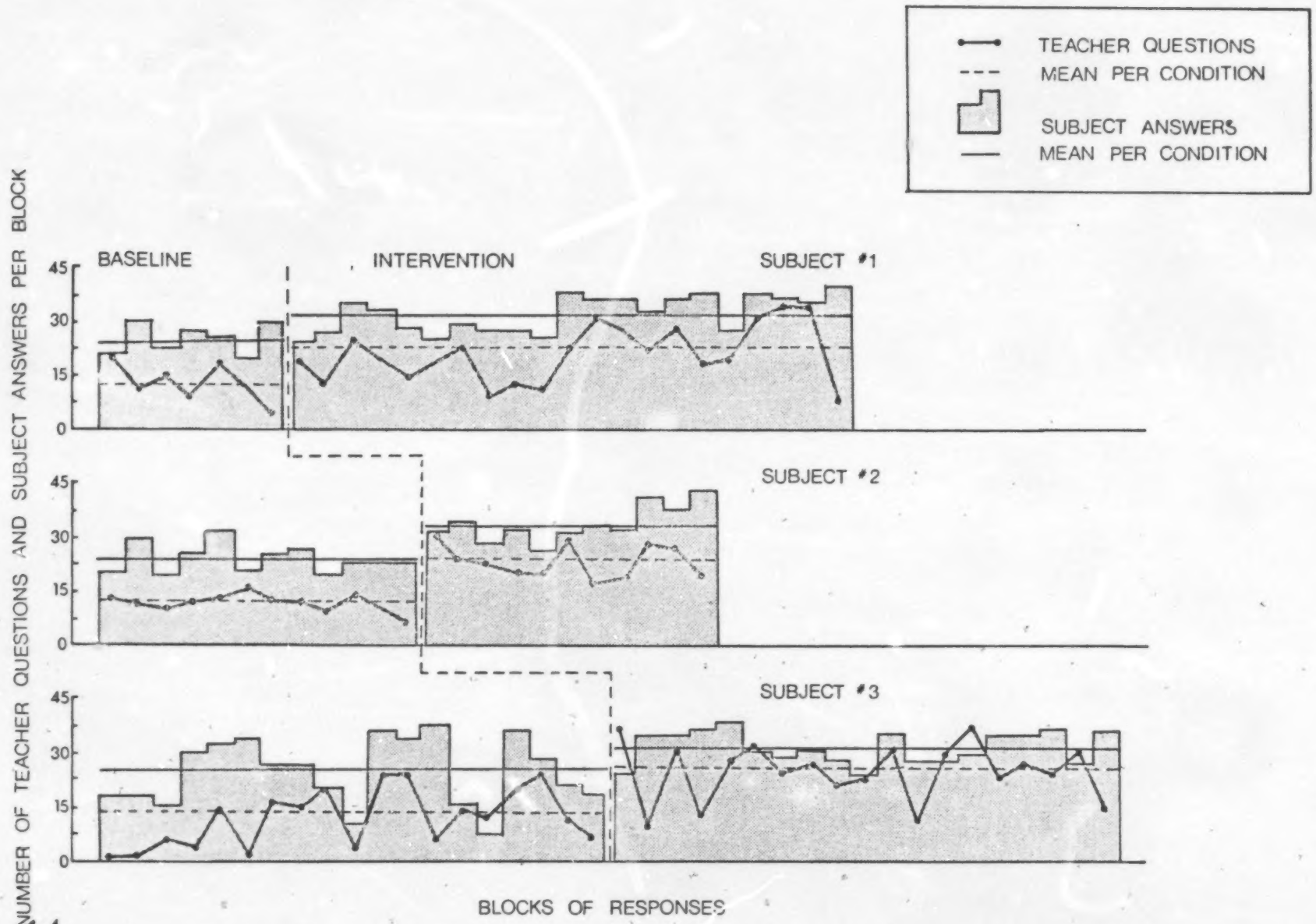
TEACHER QUESTIONS
MEAN PER CONDITION
SUBJECT ANSWERS
MEAN PER CONDITION
BASELINE
INTERVENTION
SUBJECT #1
SUBJECT #2
SUBJECT #3
45
30
15
0
NUMBER OF TEACHER QUESTIONS AND SUBJECT ANSWERS PER BLOCK
BLOCKS OF RESPONSES

Table 1

Correlations Significant at the .01 Level

The correlation coefficient is shown in parentheses.

	Consequences Correlated with Teacher Questions:		
	Subject 1 (Teacher A)	Subject 2 (Teacher A)	Subject 3 (Teacher B)
Positive Correlations	----	General Positives (.66)	---
Negative Correlations	Yes/No Questions (.64) Mands (.60) Instructions (.[illegible])	General Negatives (.75) Mands (.77)	---
	Responses Correlated with Subject Answer Combinations:		
	Subject 1	Subject 2	Subject 3
Positive Correlations	---	---	---
Negative Correlations	Question/Mand (.67) Statements (.56)	Question/Mand (.51) Statements (.75)	No Answers (.73) Statements (.52)